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THE TREATMENT OF POLIOMYELITIS UNDER ORTHODOX, KENNY, AND PROSTIGMINE METHODS

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Over a period of fifteen years we have seen poliomyelitis treated by a variety of methods and in many cases by no method at all. The results were always expected to be poor and patients were expected to spend many months or years in institutions for the crippled. The so-called "orthodox" method of immobilization on a Bradford frame, in casts, splints and braces was considered the best method of resting the "damaged anterior horn cells" that were supposedly destroyed. Corrective operations after two years of the above treatment were anticipated and carried out in many cases. In 1937, the Retan method of perivascular drainage was tried in our clinic with some improvement which was not sufficient in paralytic cases to be able to ascribe it to the method or to the natural course of the disease. This method required a great deal of work and observation, and its dangers did not justify its use.

In October, 1941, we became interested in the Kenny Concept of infantile paralysis and in the treatments as outlined by Miss Elizabeth Kenny in Minneapolis and later in Wilmington. As stated before[1], with the Kenny method of treatment we noticed unusual improvement: no deformities, no stiff joints, no contractures, early convalescence, happy patients, and what also is very important, happy families who were able to take their patients home after a comparatively short period of hospitalization.

Kabat and Knapp[2] reported on the action of prostigmine on subacute and chronic poliomyelitis patients who were also receiving hot packs. Their results were very encouraging. It was noted that the drug had the ability to relax muscle spasm and improve incoordination and alienation in the subacute and chronic cases who did not respond to the hot packs alone. Inspired by this work, we decided to use prostigmine without hot packs on acute, subacute and chronic cases. This work was reported in a previous communication.[3] We showed that this parasympathicomimetic drug could be used as a substitute for the hot packs, and that additional and substantial relaxation of muscle spasm was obtained in chronic patients who had formerly received the Kenny hot packs over a period of many weeks. It was also noted that patients who had been formerly treated by other methods over a period of years made spectacular improvement with prostigmine. Kenny muscle reeducation was used in all the patients.

We now present the results of the treatment of 157 cases of acute poliomyelitis treated in the five-year period of 1941 to 1945, inclusive. All of these patients were admitted and treated in the Doris Memorial Unit of the Wilmington General Hospital. The 1941 group was treated by the orthodox method, the 1942 by using the Kenny packs, in 1943 the packs were omitted and prostigmine was used, and the 1944 and 1945 patients were treated by hot packs and prostigmine simultaneously.

On admission each patient became an individual problem. The diagnosis was carefully established and the muscles involved outlined. Angle measurements of the various joints were made so that their degree of relaxation could be measured. The frequency of hot packs was varied according to the severity of the disease and the parts involved. Where chest muscles were involved, the foments were changed as often as every ten minutes, and as relaxation of the muscles progressed the time was gradually extended to two hours. The neck and back usually required prolonged packing. Stimulation was done daily and passive movements were not begun until all spasm and pain disappeared. In time patients were

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allowed to sit up, then get out of bed and walk. Packs and prostigmine were discontinued as soon as all evidence of spasm disappeared and coordination of muscles was established. All patients were sent home as soon as they were able to walk on their power or with aids, and they returned to the out-patient clinic for additional muscle reeducation and observation. All patients were checked frequently by the physician to be sure that spasm did not return. It was a common experience to see a slight scoliosis beginning, an elevated shoulder, spasm in the gastrocnemius or in other muscle groups make its appearance after overexertion. These were easily corrected with proper measures.

The nursing care was that outlined by Sister Kenny.[4] Patients were kept between blankets, high caloric diets were given, and to some patients vitamins such as cod liver oil and ascorbic acid were given. The muscle reeducation was done by trained physiotherapists who spent several months in Minneapolis under Sister Kenny. The patient and technician were always alone in the treatment room, thus enabling the patient to concentrate on the movements of the muscles.

No immobilization of any kind was employed. Some have contended that the fracture board under the mattress and the foot board are in effect another form of immobilization. This is not true. After all, the patient has to be in bed. He is not restricted in his movements and the foot board is not used in the acute stage when there is active spasm in the gastrocnemii. The foot board is used later to keep the soles of the feet in contact with a firm surface in order to preserve as much as possible the proprioceptive sense of the standing reflex. After the patient is walking the foot board is not used. At other times, we use the foot board for stretching the gastrocnemii by having the patient keep his feet flat against the board, using force when necessary. Keeping the mattress away from the foot board gives a space for the heels and for the feet when the patient is lying in the supine or prone position. The position is changed frequently in order to keep him comfortable and to help to relax involved muscles. An effort is made to keep the patient in a straight "standing" position in bed. This is difficult to do in young children and nothing is done to force them. At times we used rolled towels or small sand bags on the sides of the legs to assist patients in keeping in good alignment. Naturally, when hot packs were used, they acted as a means of keeping the patient in the proper position. Every time the foments were changed the joints were moved passively, depending always on the condition of the individual case. Nurses were taught to handle the patients very carefully so that no muscles were stretched or injured.

Oxygen was used frequently by face mask or nasally in severely affected patients, especially the bulbar type. Intravenous fluids and other medications were employed according to the condition of the patient. All patients with bulbar paralysis were placed in bed with the head lowered, aspiration of mouth and throat fluids was taken care of by the nurse, and the position of the patient was changed to the prone or supine position, according to the individual case. Usually, ability to swallow gradually returned in 7-10 days. Fluids were supplied parenterally, giving the necessary calories in glucose and amino-acids or plasma. In one case, a female, aged 30, it was necessary to do a gastrostomy on the twenty-first day of the disease because of difficulty in swallowing. This patient was fed through the tube for about three weeks and gradually returned to oral feedings and the gastrostomy was allowed to close.

The patients reported in the tables to follow have been recently checked by the technicians and the physician, and frequent orthopedic consultations have been made.

Prostigmine* bromide by mouth and prostigmine methylsulphate hypodermically has been used very extensively and in many neuromuscular dysfunctions. It is not within our province here to discuss its theoretical actions in the central nervous system. Its action in the myoneural junction has been well proven by its spectacular action in reviving within a few minutes the generalized muscle weakness of the myasthenia gravis patient. Table I outlines the dosages used in our series.

* The prostigmine used in this study was kindly supplied by Hoffman-La Roche Co., Nutley, N. J.

TABLE I. Prostigmine Dosage Schedule Per 24 Hours

	Tablets—15 Mgs.	Ampules—1:2,000
½ to 2 years of age.....	2 to 3	1½ to 3
3 to 5 years of age.....	3 to 8	1 to 4
6 to 10 years of age.....	4 to 9	3 to 6
11 to 15 years of age.....	6 to 12	4 to 8
16 to 21 years of age.....	8 to 12	4 to 16
21 years of age and over	3 to 8	6 to 12

The dosage depends entirely on the amount of muscle spasm present on admission. In mild cases the tablets are sufficient to produce relaxation, in moderate cases the smaller schedule of ampules alone is sufficient. In severe cases the high dosage of ampules is started, and as the relaxation approaches the moderate stage the dosage is reduced to the smaller schedule. Where the patient objects to the hypodermic injections or where relaxation is occurring steadily, we change over to the tablets, the smaller or higher dosage according to the degree of spasm present.

In general, children stand the prostigmine very well with very little discomfort. If abdominal cramps are severe a small dose of atropine by mouth (gr. 1/150 if 7 years of age and 1/200 in younger patients) usually brings relief. Male and female children tolerate the drug alike.

Adult patients, especially those over 21 years of age, do not tolerate the tablets as well —they complain of nausea, severe abdominal cramps, and tenesmus. The same is true of the ampules in a smaller percentage of such adults. In some cases an adult will tolerate 3 to 6 ampules, given one every 4 hours, but he cannot take more than one tablet daily without nausea, vomiting, and a feeling of extreme nervousness. Pregnancy in a patient is no contraindication to the drug (Case 52: female, aged 16, in sixth month of pregnancy, had 146 tablets, went to a normal termination.)

In all patients it is wise to start with a small dose at first and note any reaction for the first two days; if there is none, one proceeds with the larger doses. In small children a large initial injection may cause a feeling of fainting with pallor and cold clammy skin. This condition rapidly improves, however, without the administration of any stimulants.

The number of patients treated in each of the five years, and their type of paralysis is illustrated in Table II. This comprises practically all patients with poliomyelitis reported in the state of Delaware, since the Doris Memorial Unit is the only communicable disease hospital in the state. The few patients who were not treated at this clinic in 1944 were either light or expired before the diagnosis was made. It will be noted that 130, or 83 per cent, were under the age of 14, and that 60 per cent were males. The youngest was 10 months and the oldest 42 years of age. 42.5% of all patients were non-paralytic. The number of non-paralytics was higher in 1942—10 out of 16. This should be kept in mind when one compares the results.

TABLE II. Poliomyelitis Patients, 1941-1945

Years	1941	1942	1943	1944	1945	Totals
No. of Patients	19	16	5	88	29	157
Male	13	11	4	48	16	92
Female	6	5	1	40	13	65
1- 7 Years of Age	8	8	2	42	14	74
8-14 Years of Age	7	7	3	31	8	56
15-21 Years of Age	3	0	0	9	3	15
22-42 Years of Age	1	1	0	6	4	12
Non-paralytic	9	10	1	33	14	67
Paralytic Spinal....	9	4	4	39	13	69
Paralytic Bulbar	1	2	0	16	2	21

Table III outlines the anatomical regions paralyzed. There was actual paralysis of 24 upper extremities. All of these were treated without any type of splint at any time; the results were superior to the former splint methods. This was shown by the absence of ankylosis of joints, or of deformities, and by good return in muscle function. The 19 patients with paralyzed sternomastoid muscles all had bulbar paralysis; many of these have thinner muscles on the involved side but none have any functional disability. All of the patients with swallowing paralysis have returned to normal. Seven of the expired group had bulbar or respiratory paralysis; the eighth had endocarditis and pericarditis.

TABLE III. Muscles Involved in 90 Patients with Spinal (69) or Bulbar (21) Paralysis at the onset.

Years	1941	1942	1943	1944	1945	Totals
No. of Patients	10	6	4	55	15	90
Upper Extremity	3	4	3	11	3	24
Lower Extremity	8	6	4	48	11	77
Face	0	0	0	4	0	4
Sternomastoid	0	2	0	16	1	19
Speech	0	2	0	6	1	9
Swallowing	0	2	0	10	1	13
Abdominal	0	1	1	6	2	10
Respiratory (Expired)	1	0	0	4	3	8

Table IV shows the influence of the type of treatment on the duration of hospitalization. Of the 19 patients treated in 1941, five were under our care and were treated by packs. However, because of our lack of experience and the lack of training of our technicians in the Kenny method of muscle reeducation, we classified them as being treated by the old method. Five of the other 14 patients of 1941 returned to us after a year or later for treatments in the Kenny clinic with packs and prostigmine; there was one fatality. The remaining 8 patients have not been treated by us but we have some knowledge of their present condition. Thus we are considering the 1941 group as a control group: all of these patients were treated by recognized orthopedic measures in vogue at that time. All of the groups have had considerable follow-up and observation as out-patients. The 1942-1945 patients were not sent home until they were able to walk on their own power or with the aid of sticks or braces (except one paralytic in 1943 who went home against advice and was treated in bed at home; this patient is completely paralyzed from the hips down and is now beginning to use braces and crutches). On the other hand, many of the 1941 patients were sent home and remained in bed there for some time. Thus, the average hospitalization has been reduced from 160.2 days in the control group of 1941 to 32.1 days in the Kenny-prostigmine group of 1945.

It is noteworthy that the days devoted to packing were reduced from 69.5 in 1942 when no prostigmine was used, to 27.1 in 1944 and 25.8 in 1945 when prostigmine was used in conjunction with the hot packs. This has reduced the nursing care required in the application of hot packs.

TABLE IV. Hospitalization Period

Type of Therapy	1941	1942	1943	1944	1945
Orthodox	X				
Packs		X			
Prostigmine			X		
Packs and Prostigmine				X	X
Days packing per case	0	69.5	0	27.1	25.8
Days of hospitalization	3044	1294.0	336	3163.0	930.0
Hospitalization days per patient	160.2	80.9	66	36.0	32.1

Table V shows the residual incapacitating paralysis present in the various groups as of May 31, 1946. It is at once apparent that the number of patients who are still incapacitated is greater in the 1941 control group. This is true in spite of the fact that 5 of these patients returned to us in the meantime for many more months of additional treatment with hot packs, prostigmine, and occupational therapy.

In the evaluation of the results from year to year one has to keep in mind that the severity of the disease differs from year to year. For example: in 1942 there were only 6 paralytics out of 16 patients; in 1944 there were 55 out of 88; and in 1945 there were 15 out of 29. Thus the 1944 outbreak was more severe than that of other years. It should further be kept in mind that the 1942-1945 groups received closer attention and a great deal more nursing care than the 1941 group. These patients also had the benefit of early diagnosis, Kenny management, prostigmine, other new developments in muscle treatment such as early stretching, etc., functional rehabilitation, and occupational therapy.

TABLE V. Residual Incapacitating Paralysis as of May 31, 1946

Year Type of Treatment	1941 Orthodox	1942 Packs	1943 Prostigmine	1944 Packs & Prost.	1945 Packs & Prost.	Totals
All Patients	19	16	5	88	29	157
All Paralyzed Patients	10	6	4	55	15	90
All Surviving Paralyzed	9	6	4	51	12	82
Upper Extremity	1	0	0	2	0	3
One Ankle	1	0	0	5	0	6
Both Ankles	1	0	0	1	0	2
One Lower Extremity	2	1	0	2	0	5
Both Lower Extremities	0	0	1	0	1	2
Back and Abdomen	0	0	0	1	0	1
Totals	5	1	1	11	1	19
% of All Patients	26.30	6.20	20.00	12.50	3.40	12.10
% of All Paralyzed	50.55	16.66	25.00	20.00	6.66	21.11
% of All Surviving Paralyzed	55.55	16.66	25.00	21.56	8.33	23.17

Table VI records the present status of the 1942-1945 patients on May 31, 1946. All these patients (except 9 who have moved but whose present condition is known) have been reexamined recently at the clinic. The nine who use a brace can walk without it if necessary, and are expected to make further improvement. The three who require an aid are still severely paralyzed; two have both lower extremities completely flail; one has one lower extremity in a brace but may improve more with age. Of the entire group 119 (86.2 per cent) can be classed as functionally normal.

TABLE VI
Present Condition of 1942 - 1945 patients (May 31, 1946)

	No.	Percent
1. Perfectly normal	105	76.1
2. Residual paralysis but not incapacitated	14	10.1
3. Use an aid in order to walk well	9	6.5
4. Not able to walk without aid	3	2.2
5. Expired	7	5.1
Total number of patients treated	138	100.00

SUMMARY

A brief outline of the various methods of treating poliomyelitis is given, with a description of our management of 138 acute cases. The dosage schedule and untoward symptoms encountered by prostigmine therapy are outlined. Tables of 157 acute cases are presented, comparing the results attained by the orthodox method, Kenny packs, prostigmine, and a combination of packs and prostigmine treatment.

CONCLUSIONS

The best method of handling acute poliomyelitis at the present time is that based on the Kenny concept of the disease, using hot packs and prostigmine in order to relax muscle spasm, incoordination and alienation, and using Kenny muscle reeducation, functional rehabilitation, and occupational therapy.

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EVALUATION OF SPINAL FLUID EXAMINATION IN PATIENTS WITH POLIOMYELITIS*

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In spite of many authoritative statements concerning the true value of spinal fluid studies in poliomyelitis, discussion of the merits and demerits of spinal taps continues.

An analysis of examinations of spinal fluids from 95 patients may contribute to clarify the important problem. To facilitate the analysis, the patients were divided according to sex, to age groups, and according to the type, and to the outcome of the disease.

* From the Doris Memorial Hospital, Wilmington General Hospital.

TABLE I. Patients in Whom Spinal Fluids Were Studied

AGE	1 to 7		8 to 14		15 to 21		22 and Over		Totals		
SEX	M	F	M	F	M	F	M	F	M	F	Both
Non-Paralytic, Recovered .	19	4	11	6	1	1	0	4	31	15	46
Paralytic, Recovered	10	3	4	3	2	3	0	1	16	10	26
Paralytic, Incapacitated	10	2	5	1	1	1	1	2	17	6	23
Totals	39	9	20	10	4	5	1	7	64	31	95
Totals	48		30		9		8		95		95

The proportion of male to female patients was roughly 2:1 (64:31). Among the 78 children there were 59 boys and 19 girls (3:1); among the 17 adults were 5 men to 12 women (1:2). The ratio of paralyzed and non-paralyzed patients was roughly 1:1 regardless of sex or of age groups. Twenty-six of all 49 paralyzed patients recovered; of the remaining 23, 6 died, 3 have at present two extremities incapacitated, and 14 still have one extremity paralyzed.

The routine spinal fluid analysis consisted of the gross observation, a quantitative and differential cell count, a globulin reaction (Pandy's), and a quantative estimation of the protein and sugar content. Chlorides were estimated in three samples only: the values were normal (714, 726, 915 mg. per 100 ml.). A colloidal gold was set up 36 times, without the slightest deviation from the normal. A complement fixation test was performed in 42 fluids, with negative results. Aerobic and anerobic cultures of 47 specimens remained sterile.

The spinal fluid pressure was increased in a single non-paralytic patient. The only other abnormal finding in his fluid was a lymphocytic cell count of 400 per cu. mm. This patient recovered. The majority of specimens were clear; cloudiness appeared with an increased number of polymorphonuclear leukocytes. The reaction for globulin was mostly negative, a few fluids with 25 or 35 lymphocytes per cu. mm. giving slightly positive results; as a rule, however, a strong positive reaction appeared with a marked increase in the cell count and then regardless of the type of the cells. Similar observations were made in regard to protein. In the vast majority the values were within normal limits. There were some exceptions: in two fluids with normal cell counts (1 and 4 cells per cu. mm.) the protein equaled 76 and 90 mg. per 100 ml., respectively.* Otherwise, larger amounts of protein (up to 200 mg. per 100 ml.) were present only together with an increase in globulin and in the cell count. It did not seem expedient to determine the protein fractions. The amount of sugar (reducing substances) was mostly normal. In 4 samples the sugar was increased above 85 mg. per 100 ml.—values were 118, 107, 96, and 92.5 mg. per 100 ml. One paralyzed patient who recovered had a spinal fluid glucose of 96 mg. per 100 ml. and 22 lymphocytes per cu. mm.; another paralyzed patient who did not recover completely had 118 mg. of glucose, 70 lymphocytes; two patients with bulbar paralysis who both expired had 92.5 mg. of glucose and 600 lymphocytes, and 107 mg. of glucose per 100 ml. and 356 polymorphonuclear leukocytes per cu. mm. The findings were in no relation to the age and sex distribution of the patients nor the type of their disease.

The relation of the cell count to disease, age, and sex is shown in Table II.

From Table II it is evident that of our 95 patients, 42 or 44.2 per cent, had less than 11 cells per cu. mm. in the spinal fluid, 31 or 32.6 per cent, had between 11 and 100 cells, while 22, or 23.2 per cent, showed a cell count higher than 101. The 49 paralyzed patients were represented with 16, 21 and 12, respectively, in the arbitrary three-cell groups (up to 10, 11 to 100, 101 or more). The non-paralytic showed a different distribution: 26, 10 and 10.

Of 42 patients with normal spinal fluid cell counts, 16, or 38 per cent, were paralytic and 26, or 62 per cent, were non-paralytic. In the series of 53 patients with elevated spinal fluid cell counts 33, or 62 per cent, were paralyzed

* Albumino-cytologic dissociation, Guillain-Barre syndrome.

TABLE II. Patients arranged according to the number of cells in the spinal fluid, age, sex, and type of poliomyelitis.

Number of Cells Per cu. mm. of Spinal Fluid	Age in Years	1 to 7		8 to 14		15 to 21		22 and Over		Totals			Total number of patients in each "cell group"
	SEX	M	F	M	F	M	F	M	F	M	F	Both	
0 to 10	Non-paralytic Recovered	12	4	5	4	0	1	0	0	17	9	26	42=44.2%
	Paralytic Recovered	5	2	0	1	1	0	0	1	6	4	10	
	Paralytic Incapacitated	2	1	1	0	1	0	1	0	5	1	6	
11 to 100	Non-paralytic Recovered	1	0	3	2	1	0	0	3	5	5	10	31=32:6%
	Paralytic Recovered	2	1	3	1	1	2	0	0	6	4	10	
	Paralytic Incapacitated	7	1	2	0	0	1	0	0	9	2	11	
101 or more	Non-paralytic Recovered	6	0	3	0	0	0	0	1	9	1	10	22=23.2%
	Paralytic Recovered	3	0	1	1	0	1	0	0	4	2	6	
	Paralytic Incapacitated	1	0	2	1	0	0	0	2	3	3	6	
	Totals	39	9	20	10	4	5	1	7	64	31	95	95=100%
		48		30		9		8		95		95	

and 20, or 38 per cent, were non-paralyzed. Thus, the ratio of paralytic and non-paralytic patients was reversed in this survey.

The distribution of patients with bulbar paralysis and of the ones who expired is shown in Table III.

Of 10 patients with bulbar paralysis 4 expired. All had pleocytosis; three had lymphocytic and one had leukocytic characteristics. Of the six patients who recovered, 5 had predominantly lymphocytes and one polymorphonuclear leukocytes. Polymorphonuclear pleocytosis was present in the two patients without bulbar paralysis who expired.

The total number of patients whose spinal fluid showed polymorphonuclear leukocytes was 13. Ten of these patients were paralytic and 5 of these ten had bulbar paralysis; two were non-paralytic. Four of the 13 patients with polymorphonuclear leukocytes in their

TABLE III. Number of cells per cu. mm. in spinal fluids from bulbar and deceased patients, arranged according to character of condition, age, sex, and predominant type of cells.

Age in Years	1 to 7		8 to 14		15 to 21		22 and Over		TOTALS		
SEX	M	F	M	F	M	F	M	F	M	F	Both
Bulbar Recovered	2 (4L)* (180L)	0	1 (48L)	2 (3L) (90L)	0	1 (709P)*	0	0	3	3	6
Bulbar Expired	2 (20L) (70L)	0	0	1 (356P)	0	0	0	1 (600L)	2	2	4
Paralytic Expired	0	0	1 (500P)	0	0	0	0	1 (131P)	1	1	2
TOTALS	4	0	2	3	0	1	0	2	6	6	12
	4		5		1		2		12		12

*"L"—Lymphocytes, "P"—Polymorphonuclear Leukocytes.

spinal fluid died (2 had bulbar paralysis), 4 have at present residual paralysis, 5 (among them 2 with bulbar paralysis) recovered completely. In 6 patients with polymorphonuclear leukocytes the cell count was above 101. The highest count in the group was 709 cells, while the highest lymphocyte count was 888 per cu. mm.

There were some patients with mixed cell types: a non-paralytic child with a total count of 480 cells per cu. mm. had 60 per cent lymphocytes, 40 per cent leukocytes.

Because of the statement that polymorphonuclear leukocytes predominate during the first days of illness and then give way to lymphocytes, the time between onset of the disease and the first spinal tap was noted. Polymorphonuclear leukocytes were found anywhere up to the 41st day of illness, but only once the 1st, and twice the 2nd day among 12 and 7 taps respectively.

Twelve taps were done the first day of the disease: seven non-paralytic patients had from 1 to 6 cells, one had 35 cells, one had 480 cells, while 3 paralyzed patients had 1, 70, and 709 cells per cu. mm. The patient with 709 polymorphonuclear leukocytes recovered, the one with 1 lymphocyte remained incapacitated, one with 70 lymphocytes died. On the second day of illness 7 taps were made: 3 non-paralytic patients had 1, 36, and 600 lymphocytes, 4 paralyzed patients had 20 and 50 lymphocytes and 18 and 146 polymorphonuclear leukocytes per cu. mm. The last of these patients had residual paralysis, the one with 20 lymphocytes expired. The sixth day has been selected as another example: four non-paralyzed patients had 10, 296, and 400 lymphocytes and 587 polymorphocellular leukocytes each, one paralyzed who later recovered had 788; another who remained paralyzed, only 30 lymphocytes per cu. mm.

In 4 patients the spinal tap was repeated the next day: in one with bulbar paralysis (recovered) there were 2 and 4 lymphocytes, in a paralyzed recovered 54 and 47 polymorphonuclears, in a paralyzed who remained severely incapacitated 18 and 133 polymorphonuclears, and in a non-paralytic patient 87 and 16 lymphocytes per cu. mm. In two patients, two days elapsed between two taps: one, a non-paralyzed, had 140 and 200 lymphocytes; the other one, a paralytic who expired, 505 and then 110 polymorphonuclears per cu. mm. Finally, in one child the tap was done on three consecutive days with 27, 5 and 32 polymorphonuclear leukocytes per cu. mm. of spinal fluid.

DISCUSSION

This survey shows that there is no difference in spinal fluid findings from male to female patients with poliomyelitis, nor from infants, children, adolescents, or adults. In our series the youngest patient was 10 months, the oldest 42 years. Correlation of spinal fluid findings and severity of disease reveals that 50 per cent of non-paralytic patients have cell counts below 10 per cu. mm., 25 per cent have between 11 and 100 cells, and 25 per cent over 101 cells; while paralyzed patients are represented by 33 per cent in each of the three cell groups. The cell count of half of the patients with bulbar paralysis was very high, and in all but one elevated. Also half of these patients showed polymorphonuclear leukocytes. Patients with polymorphonuclear leukocytes in their spinal fluid had in the majority a severe disease; even so, some recovered completely. The statement that polymorphonuclear leukocytes dominate in the beginning of the disease could not be confirmed. Neither the type of cells nor their number follows a pattern as far as the date of illnes is concerned. There is considerable oscillation in the cell count during the course of the disease.

CONCLUSIONS

Because of the variation of findings and of the impossibility of arriving at any conclusions as to the type or degree of disease, the spinal tapping in patients with poliomyelitis may be omitted for a typical case having an acute onset with vomiting and fever and followed immediately by rigidity of the neck and back, and paralysis of one or more groups of muscles.[1] In cases with bulbar and paralysis spinal fluid should be withdrawn with great care; in the asthenic type, it should not be done at all.[2] Regardless of the type of disease only a small amount of fluid (2 c. c.) should be withdrawn.

SUMMARY

The analysis of spinal fluid examinations of 95 patients with poliomyelitis justifies the following statements:

1. The spinal fluid examination in suspected cases of infantile paralysis should not be considered a diagnostic procedure, but rather be performed for differential diagnostic purposes to rule out conditions simulating symptoms of poliomyelitis.

2. One cannot correlate the number or type of cells in the spinal fluid with the type, duration, severity or outcome of the disease.

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INTERPRETATION OF SEMEN STUDIES

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The evaluation of semen analysis depends largely upon the background and experience of the person making the study. The fact that one has to take the examined person's statements with a grain of salt does not make the task easier.

The Society for the Study of Human Fertility set definite standard requirements for semen examination[1]:

1. A three-day sexual abstinence is required before the examination.

2. The material has to be secured by interrupted coition or by autoerotic manipulation.

3. The specimen should be delivered into a clean and dry wide-mouthed glass container and should be examined within one-half hour.

The same group agreed on the normal values:

1. Semen should be viscid on ejaculation and should liquefy within thirty minutes.

2. The minimum normal volume of a sample is 2.5 c. c.

3. At least 80 per cent of all spermatozoa should be motile in the fresh sample, at least 75 per cent after 2 hours, and 10-25 per cent should be still active after 8 hours.

4. Minimum spermatozoa count per c. c. is 60,000,000; the minimum count per sample is 150,000,000.

5. The number of abnormal spermatozoa should not exceed 20 per cent.

Ten different ejaculates, representing a cross-section of the usual findings, are here analyzed. All men except one (No. 5) were examined because of barren marriage. The wives of these men were supposedly healthy. The reader who may miss a condition known under the name of "necrospermia" may, or may not accept the author's concept that such a condition does not exist. Moreover, the writer believes that all normal spermatozoa are normally motile on fresh examination. On the other hand, of the teratoid spermatozoa only those with a head smaller than normal are capable of normal movements.

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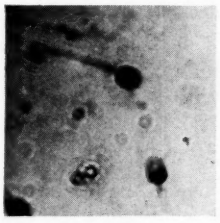

Fig. 1: Normal spermatozoa; Giemsa's stain, x 520. Patient #1.

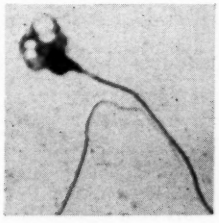

Fig. 2: Juvenile spermatozoon with vacuolized cytoplasmic rest (protoplasma of the spermatid) on the head; Giemsa's stain, x 520. Patient #2.

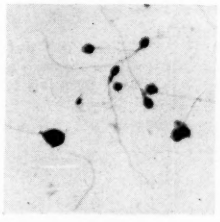

Fig. 3: Anisozoospermia: macrospermatozoon (head at 12 o'clock), megalospermatozoon (head at 8 o'clock); Giemsa's stain, x 380. Patient #7.

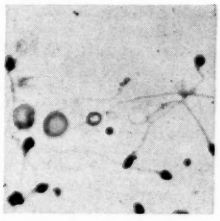

Fig. 4: Strongylospermatozoa (round heads); Giemsa's stain, x 380. Patient #3.

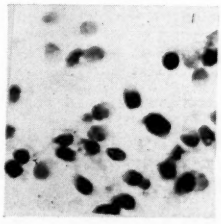

Fig. 5: Normal sperm population in biopsy of ejaculate. Paraffin section; Hematoxylin-eosin stain, x 450. Patient #6.

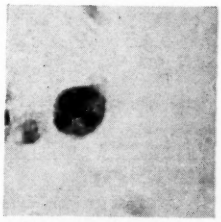

Fig. 6: Multinuclear spermatid in biopsy from semen with azoospermia. Paraffin section, Hematoxylin-eosin stain, x 450. Patient #9.

CASE 1

Highlights of the history: A 33-year-old patient, married 3½ years, no contraceptives used. Patient had anterior gonorrhea five years ago which has been completely cured.

Volume: 5.3 c. c.

Cell Count: 106,475,000 per c. c.; 564, 317,000 per sample.

Motility: 90 per cent normally motile; 10 per cent non-motile. After 2 hours 75 per cent active.

SPERMIOGRAM

Spermatids	2	Cells of the evolution	2	Immature	2%
Normospermatozoa	80	Normal	80	Normal	87%
Small head	2				
Large head	2	Physiologic variants	7		
Round head	2				
Tapering head	1				
Deformed head	10				
Displaced acrosome	1	Head abnormalities	11	Teratoid	11%
Residual bodies					

Interpretation: Normal sample. Barrenness of this couple, as of the others in which the semen was normal, may be due to faulty deposition or reception of semen, or to coital errors.

Diagnosis: Normospermia, Normozoospermia.

CASE 2

Highlights of the history: A 23-year-old patient, married for four years. Last sexual intercourse 16 hours preceding the coition at which the presented sample was produced.

Volume: 3.8 c. c.

Cell Count: 105,000,000 per c. c.; 385,000,000 per sample.

Motility: 65 per cent normally motile; 35 per cent non-motile. After 2 hours 10 per cent active.

SPERMIOGRAM

Spermatogonia	1				
Spermatocytes	3				
Praespermatids	5	Cells of the evolution	12		
Spermatids	3			Immature	19%
Cytoplasm on head	4				
Cytoplasm on neck	3	Juvenile	7		
Normospermatozoa	57	Normal	57		
Small head	1			Normal	62%
Tapering head	4	Psysiologic variants	5		
Asthenic head	1				
Deformed head	10	Head abnormalities	13		
Displaced acrosome	2			Teratoid	19%
Deformed neck	4	Neck abormalities	4		
Displaced centrosome	2	Neck abnormalities	4		
Residual bodies.					

Interpretation: Fairly normal semen with a subnormal number of normospermatozoa and an abnormally high number of immature forms. The number of cells of the spermatogenesis series is 12 instead of the normal 0.5-2 per cent. This hasty regeneration is most likely due to the fact that two ejaculations occurred 16 hours apart. It is quite safe to to assume that an examination after a three-day pause would reveal an entirely normal semen.

Diagnosis: Oligonormozoospermia. Shift to the left.

CASE 3

Highlights of the history: A 30-year-old man, married six years, but only in the last seven months no contraceptives have been used. The patient is an alcoholic.

Volume: 3 c. c.

Cell Count: 85,000,000 per c. c.; 255,000,000 per sample.

Motility: All motile 70 per cent; 60 per cent normally motile; 10 per cent sluggishly; 30 per cent non-motile. After 8 hours 15 per cent motile.

SPERMIOGRAM

Spermatocytes	2	Cells of the evolution	4		
Spermatids	2			Immature	7%
Cytoplasm on head	2				
Cytoplasm on neck	1	Juvenile	3		
Normospermatozoa	29	Normal	29		
Small round heads*	41	Variants*	41	Normal*	70%
Asthenic heads	3				
Deformed heads	8	Head abnormalities	23	Teratoid	23%
Displaced acrosome	12				
Some pus cells.					

Interpretation: This semen is normal in all but one respect: 41 per cent of all spermatozoa show a small and round head. A somewhat smaller head, or rounded head, may be considered in the limits of normal variants. In a combination the normalcy is doubtful. The number of round or small spermatozoa hardly ever exceeds 4 per cent of all cells. The number of microstrongylospermatozoa in this sample is 41 per cent. It is, therefore, impossible to pass over this phenomenon. The motility of this cell type is normal, even after 8 hours. Therefore, one has to assume that we face an unusual variant of normal spermatozoa. The patient's alcoholism may or may not have bearings upon the spermiogram. Many alcoholics have perfectly normal spermatozoa. The writer recalls a similar finding in an epileptic patient. The only reference to the problem is Stiasny and Generales'[2] mentioning that alcoholics have often large and round spermatozoa. They report two spermiograms of alcoholics (in one there are more deformed heads than round heads, in the other there are 20 per cent spermatozoa with round heads, 15 with small and 12 with large heads) and one of an epileptic alcoholic (with 25 per cent round, 11 per cent large heads). Incidentally, their 11 epileptics have many strongylospermatozoa (from 5 to 25 per cent). The variation observed in this semen represents most likely a constitutional anomaly. (Something like elliptocytosis of erythrocytes.)

Diagnosis: Normospermia with microstrongylozoospermia.

CASE 4

Highlights in the history: A 33-year-old patient. married 3½ years. Contraceptives used in the first half year of marriage only.

Volume: 3.1 c. c.

* The spermatozoa with small round heads were considered as "normal," chiefly because of their normal motility.

Cell Count: 95,750,000 per c. c.; 287,250,000 per sample.

Motility: All motile, 80 per cent; 30 per cent normally motile; 50 per cent sluggishly motile; 20 per cent non-motile. After 2 hours 25 per cent motile.

SPERMIOGRAM

Cytoplasm on head	0.5	Juvenile	3.5	Immature	3.5%
Cytoplasm on neck	3.0				
Normospermatozoa	72.5	Normal	72.5	Normal	76.5%
Small head	0.5				
Large head	0.5	Physiologic variants	4.0		
Round head	1.0				
Tapering head	2.0				
Asthenic head	2.0				
Gigantic head	2.0				
Deformed head	12.0	Head abnormalities	20.0	Teratoid	20.0%
Displaced acrosome	4.0				

Interpretation: This semen is normal save for the motility of the spermatozoa. The number of all active spermatozoa and of all normally developed spermatozoa agree. However, on examination of the fresh sample procured by masturbation only three out of eight are normally motile, while the other five move only slowly. There is at present no explanation for this phenomenon. It is frequent in alcoholics and in smokers. A second examination may possibly show normal motility as this is frequently a temporary phenomenon.

Diagnosis: Normospermia, Hypokinesis.

CASE 5

Highlights of the history: A 42-year-old man who brought a semen sample from nocturnal emission.

Volume: 4.4 c. c.; rusty brown colored.

Cell Count: 95,000,000 per c. c.; 418,000,000 per sample.

Motility: 50 per cent normally motile after 18 hours.

SPERMIOGRAM

Cytoplasm on neck	3	Juvenile	3	Immature	3%
Normospermatozoa	83	Normal	83	Normal	89%
Small head	2				
Large head	2				
Round head	1	Physiologic variants	6		
Tapering head	1				
Deformed head	6				
Displaced acrosome	2	Head abnormalities	8	Teratoid	8%

Numerous well preserved erythrocytes, few leukocytes

No characteristic microflora. A few gram-positive diplococci, cocci and rods, no acid-fast organisms.

Benzidine test for blood pigment: strongly positive.

Interpretation: The abnormal findings in this sample are the brownish discoloration of the specimen and the microscopic finding of red blood cells. It is remarkable that 50 per cent of the spermatozoa were normally motile 18 hours after production of the sample, and that they were active in the presence of a large number of erythrocytes. The explanation of the hemospermia would be simple if the sample would originate from masturbation or from repeated intercourse within a short interval. The rupture of small blood vessels during a forceful ejaculation is not unusual. The blood may originate anywhere in the urogenital tract and may be caused by a number of conditions ranging from varicosity to papilloma. Only a careful urologic examination could aid to determine the site of hemorrhage.

Diagnosis: Hematospermia, Normozoospermia.

CASE 6

Highlights of the history: A 42-year-old man, married for ten years. In the first year of marriage a healthy, normal boy was born. During the last three years no contraceptives have been used.

Volume: 3.1 c. c.

Cell Count: 49,310,000 per c. c.; 152,861,000 per sample.

Motility: All motile, 90 per cent; 80 per cent normally motile; 10 per cent sluggishly motile; 10 per cent non-motile. After 2 hours 70 per cent motile.

SPERMIOGRAM

Cytoplasm on neck	5.5	Juvenile	5.5	Immature	5.5%
Normospermatozoa	84.0	Normal	84.0	Normal	87.0%
Small head	0.5				
Large head	1.0				
Round head	0.5	Physiologic variants	3		
Tapering head	1.0				
Giant head	1.5				
Deformed head	4.0	Head abnormalities	7.5	Teratoid	7.5%
Displaced acrosome	2.0				

Interpretation: A case of one-child sterility. The number of spermatozoa per c. c. is 49,310,000 which is about 10,000 below the accepted minimum while their number per total volume is just at the lowest normal limit. This is a typical case of oligozoospermia and the prognosis is very good as this condition usually is a temporary one. In addition, instances of fertilization with semen with even lower counts are well-known, provided that the other features are normal, as in this case.

Diagnosis: Oligozoospermia.

CASE 7

Highlights of the history: A 36-year-old man.

Volume: 4.8 c. c.

Cell Count: 45,000,000 pr c. c.; 216,000,000 per sample.

Motility: All motile, 85 per cent; 60 per cent normally motile, 25 per cent sluggishly motile, 15 per cent non-motile. After 2 hours 45 per cent motile.

SPERMIOGRAM

Spermatocytes	5				
Spermatids	1	Cells of the evolution	6	Immature	15%
Cytoplasm on head	1				
Cytoplasm on neck	8	Juvenile	9		
Normospermatozoa	48	Normal	48	Normal	54%
Small head	1				
Narrow head	4	Physiologic variants	6		
Tapering head	1				
Asthenic head	3				
Giant head	2				
Deformed head	6	Head abnormalities	29	Teratoid	31%
Displaced acrosome	18				
Deformed neck	1	Neck abnormalities	1		
Displaced centromsomel	1	Tail abnormalities	1		

Many residual bodies

Interpretation: The number of spermatozoa per 1 c. c. is lower than normal, the number per sample is, however, normal. There is an increase in immature forms, and especially an abundance of abnormal forms of spermatozoa. The number of abnormal forms should not exceed 20 per cent; it is, however, 31 per cent in this sample. There is a wide variety of abnormally formed spermatozoa. The prognosis is only fair, but by no means good.

Diagnosis: Aethenozoospermia. Anisozoospermia.

CASE 8

Highlights of the history: A 27-year-old man who has been married four years. Contraceptives were used for three years. Last sexual intercourse a day prior to semen study.

Volume: 1.9 c. c.; after thirty minutes thick liquid with some gelatinous particles.

Cell Count: 12,500,000 per c. c.; 23,750,000 per sample.

Motility: All motile, 85 per cent; 35 per cent normally motile; 50 per cent sluggishly motile; 15 per cent non-motile. After 2 hours 30 per cent active.

SPERMIOGRAM

Spermatogonia	1				
Spermatocytes	2				
Spermatids	1	Cells of the evolution	8		
Metaspermatids	4			Immature	14%
Cytoplasm on head	1				
Cytoplasm on neck	5	Juvenile	6		
Normospermatozoa	48	Normal	48	Normal	54%
Tapering head	6	Physiologic variants	6		
Deformed head	18				
Displaced acrosome	11	Head abnormalities	29		
Deformed neck	1	Neck abnormalities	1	Teratoid	32%
Displaced centrosome	2	Tail abnormalities	2		
Residual bodies					

Interpretation: This sample is largely abnormal. The volume is subnormal, the liquefaction is incomplete, the cell count is very low per c. c. and per sample as well, half of the spermatozoa are sluggish, the number of immature forms is high, and so is the number of teratospermatozoa. Only the large number of immature cells may be taken lightly because the patient had sexual relationship 24 hours prior to examination. The other findings are serious. The high number of abnormal forms makes one doubt whether it is worthwhile to attempt stimulation of a germ plasma which may be a priori abnormal.

Diagnosis: Asthenospermia. Asthenozoospermia, Anisozoospermia.

CASE 9

Highlights of the history: A 32-year-old man, married for five years. In the first year of marriage contraceptives were used. Testicles descended into the scrotum after puberty, their size is about one-half of the norm.

Volume: 1.6 c. c.; after 30 minutes and after one hour there are still jello-like particles present.

The examination of hanging drops and slides reveals a few round cells but no spermatozoa. Besides leukocytes there are some large mononuclear phagocytes, a few cells of the spermatogenesis series, spermatids, some multinuclear spermatids, praespermatids and especially spermatocytes, some of which are in telophase. In some of the large cells are inclusions (possibly representing heads of spermatozoa?).

Interpretation: The volume of this sample is subnormal and the liquefaction is incomplete. Spermatozoa are absent, but a few cells of the spermatogenesis series are present in films and in histologic sections of the specimen. We diagnose a maturation arrest in the evolution of the germ cells. In similar instances testicular biopsy is used to decide whether this state is due to atrophy of the cells of seminiferous tubules or due to hypoplasia. The post-pubertal descensus of the testicles explains fully the testicular hypoplasia of our patient.

Diagnosis: Asthenospermia, Azoospermia.

CASE 10

Highlights of the history: A 32-year-old man, married for five years. Had a right hernia operation a few years ago. Right testicle one-third the size of the left one.

Volume: 1.6 c. c.

No spermatozoa or cells of the spermatogenesis series in fresh drops, smears and paraffin sections. A moderate number of polymorphonuclear leukocytes, a few gram-positive cocci in clusters, an occasional gram-negative rod.

Interpretation: The amount of semen is small. There are no spermatozoa or cells of the spermatogenesis series present in multiple slides and sections of the ejaculate. We are dealing with a bilateral obstruction of the seminal passages. The patient's right testicle is atrophied due to ligation of the was deferens during the operation of the hernia. There is, however, an obstruction on the left side as well, the site of which can only be detected by urethroscopic catheterization and radiography. Most likely this patient had had a left side epididymitis which led to obstruction. A biopsy of the left testicle is indicated. Should such biopsy reveal normal germ plasma, an epididymo-vasostomy could be performed, or the patient's own semen, secured by puncture, could be used for artificial insemination.

Diagnosis: Aspermia.

DISCUSSION

Because each case has been discussed together with the interpretation of the results of the semen study, a general discussion seems unnecessary. Instead, the various terms used in the diagnosis will be clarified.

Normospermia: a normal semen sample.

Normozoospermia: normal spermatozoa.

Oligonormozoospermia: decreased number of normal spermatozoa.

Oligozoospermia: subnormal number of spermatozoa.

Microstrongylozoospermia: semen with spermatozoa with small round heads.

Hypokinesis: lowered degree of motility.

Shift to the left: an increase in immature cells of the spermatogenesis series.

Hematospermia: semen mixed with blood.

Anisozoospermia: variation in forms of spermatozoa.

Asthenozoospermia: deficient spermatozoa.

Asthenospermia: deficient semen.

Azoospermia: no spermatozoa present, cells of evolution present.

Aspermia: no semen present, no testicular elements whatsoever.

SUMMARY

Twelve analyses of semen samples which represent a cross-section of findings are presented.

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UROLOGIC OBSERVATIONS IN THE EUROPEAN THEATRE OF OPERATIONS

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This report represents personal observations over a three-year period in several hospitals during the course of the war. It is not an attempt to detail the urologic coverage from an overall point of view. The bases for the data included in this paper are notes and case records made at the time they were observed. The E. T. O. in this article refers entirely to the United Kingdom which until after D-Day, June 6, 1944, was the E. T. O. The material collected from December, 1942, until December, 1945, is divided into three sections:

First Period—Before D-Day

8 December 1942—6 June 1944. During this period the urologic service consisted in the main of office urology with an emphasis on the treatment of gonorrhea, non-specific urethritis, chronic prostatitis, and diagnostic cystoscopies and pyelographies. There was an occasional ureteral calculus that in my experience passed without operative interference. The management of gonorrhea was at a later date transferred to the medical service for administrative reasons. However, I continued to see these patients despite the directive that actue gonorrhea was a medical and not a urological problem.

For the long period before D-Day the work resembled that of civilian practice. The serious diseases were pretty well screened out before the young troops came overseas. The diseases present in this group had an acute character. As a group from which to draw patients these men had little to offer. There was no prostatism among this group. However, two unusual urologic symptom complexes arose among these soldiers in a percentage far in excess of anything I had seen in civilian practice in otherwise healthy adults. The incidence was too great to be ignored. The experience of other urologists in the E. T. O. similar to mine confirmed the impression that we were dealing with a real entity generated by the circumstances in which the troops were living.

The first of these conditions is the so-called "non-specific urethritis," which the Army designated as non-venereal. During the early days in England as many as 25 per cent of all urethral discharges were reported as non-specific. This was out of all proportion to the civilian incidence of this same condition. The diagnosis was based upon repeated negative microscopic and cultural examinations for Neisseria gonorrhoeae. Occasionally, gram-negative extra-cellular displococci or gram-positive extra-cellular diplococci were seen. In most instances smears of the urethral discharge showed only pus cells and no microorganisms. The history was typical and the discharge itself had a characteristic appearance: the patient, when questioned, reported that in the past ten to fourteen days (sometimes less, but rarely more) he had had sexual exposure, sexual excitement, or an alcoholic debauch. Prohylaxis of the mechanical and the chemical variety had in many cases been taken. The patient had no urinary symptoms at all. However, in the morning before the initial voiding upon waking he noted a small pearly gray drop of pus at the meatus which he milked off or washed off with urine and then had nothing more to note all day. This was again seen on the following day and the patient reported on sick call. One additional detail of history which on questioning could be elicited was that from the time of the most recent sexual exposure the patient had been worried as to the possibility of contracting a venereal disease and to check on this possibility had daily been stripping down his penis to see if there was any discharge. Eventually he found something and reported for medical attention. On other occasions, however, this type of morning drop, the *goute militaire*, was

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found on morning physical inspection and the man was told to report for examination on sick call. The discovery of this suspicious urethral discharge was a surprise to the patient who could not, or so claimed, account for its presence.

In the beginning these patients were treated much as if they had an acute gonorrhea. They were given a course of sulfadiazine for five days, treated on duty, and restricted to the post for a period of two weeks following the course of therapy. The usual prohibitions concerning sexual excitement and alcohol were made. Later penicillin was substituted for the sulfadiazine with the same results. The discharge persisted despite chemotherapy but became watery in the morning, mucoid rather than purulent. No irrigations, instillations or prostatic massages were instituted during this stage of the treatment. Cultures of the secretions remained negative. These patients kept coming back for further treatment, insisting that something was the matter with them. Because the medication was unsuccessful some form of local therapy was tried. First we used instillations of a 5 per cent solution of argyrol to be held in the urethra for five minutes daily. This produced cures in some patients while still others failed to recover. In these we tried irrigations, with a 1:8,000 solution of potassium permanganate. Again a number of patients got entirely well. The length of time required for both of these forms of treatment was about four weeks. Prostatic massage was done in all patients who failed to respond to chemotherapy. Rarely was anything more found on microscopic examination than 5 to 10 pus cells per high power field. Prostatic cultures remained uniformly negative.

Finally, the therapeutic difficulties were linked to the fairly constant history that these patients were more worried than hurt and that they had developed the daily (or more frequent) habit of stripping down the urethra to see if perhaps they had a urethral discharge. This habit was possibily generated out of the Army's repeated "short arm" inspections and the educational program concerning venereal disease.

It was felt that the origin of the non-specific urethritis was the result of mechanical irritation secondary to the repeated stripping down of the urethra. Because of psychologic concern over the possibility that perhaps the patient might have acquired a urethral infection from some recent completed or attempted indiscretion, the treatment was shifted from chemotherapy to psychotherapy. First, the patient was earnestly assured that as a result of all the tests we were convinced that he did not have any venereal disease. Secondly, he was told to stop stripping down his penis and to stop examining himself every time he voided. Thirdly, he was counselled against any sexual or alcoholic excitement for a period of several weeks until the symptoms secondary to a low grade inflammation had subsided. With a combination of reassurance, explanations, and the enlightenment of understanding as to the mechanism of this type of urethritis (mechanical urethritis) good cooperation was enlisted and the patient improved.

The second symptom complex which was very prevalent in England during the months of waiting for D-Day was a marked urinary frequency, urgency, and nocturia without organic disease. Of the three symptoms the almost painful urgency was the most common and the thing which the patients complained of most. These symptoms were observed among a wide group of unselected personnel, field and garrison troops, officers and enlisted men alike. It was more prevalent among recent arrivals to the E. T. O. than among those who had been there for many months. An increased number of patients with these complaints was seen in fall and winter seasons. This was most likely coincidental.

Initially, many of these patients were admitted to the hospital and studied generally and with a full urologic work-up which included prostatic examination, a smear and a culture. The patients were cystoscoped and retrograde pyelograms were done. Nothing more than a slight trigonitis was seen. Urine cultures from kidney pelves and bladder were negative. General physical examination, blood counts, blood chemical tests and chest x-rays were likewise non-contributory. A diet which restricted tea, coffee and condiments was ordered. Medication consisted of a combination of tincture hyoscyamus, potassium citrate and potassium bromide in camphor water as

vehicle. Codeine was administered in the more severe cases. Sitz-baths were employed with good results, as they rapidly relieved the symptoms of bladder neck irritability. In all of the patients the condition cleared up completely within a week to ten days.

An explanation for this symptom complex was sought. Climatically these patients suffered a sudden change: many were abruptly thrust from a warm or cold, but dry climate into a climate which was perpetually damp and cool. The output of fluids by perspiration was markedly diminished. This increased the excretory load of the urinary tract. A second factor was a change in the character and quantity of the fluid intake. Instead of water, milk, coffee, coca cola, or other soda-fountain beverages the intake in England shifted to large amounts of tea, coffee, and beer with a drop in the water intake per se. These three exerted thir well known diuretic plus their irritant effect and the symptoms of frequency, urgency and nocturia followed.

An adjustment in the water balance occurred when the troops had become acclimated and learned how much and what to take and when to stop. Most likely they also developed some tolerance to the beverages consumed after a course of time.

From January to April 1944, I had the good fortune to be assigned to a British Venereal Disease Hospital at Netley, part of the Royal Victoria Hospital and under the guidance of Lt. Col. Ambrose King. I participated in the operation of the Kettering Hypertherm in the treatment of resistant gonorrhea and its complications, including gonorrheal arthritis. During this time I supervised the treatment of about 150 patients. There were no fatalities. More than 85 per cent of the patients were cured from a single eight-hour course of artificial fever at a temperature of 106° F. With repeated courses of therapeutic fever the percentage of cures was boosted to approximately 90 per cent. In the British series there were more than a thousand patients. My contact was a most stimulating one and the experience invaluable.

Second Period—During the Battle in Europe 6 June 1944—8 May 1945. Our unit took over the physical plant previously occupied by the British Venereal Disease Hospital at Netley and converted it into a Transit Hospital for the reception and evacuation of casualties from the invasion of France. Being only four miles from Southampton we were strategically located for such a function. The first casualties were received on D-plus-2.—three hundred freshly wounded soldiers and sailors who had had nothing more than first aid in some battalion aid-station. This was only the beginning and in an incredibly short time the hospital of 850 beds was full. The evacuation side of the hospital then went into operation. It was soon found that in order to function efficiently as a Transit Hospital only that was done which was absolutely necessary in order to make patients evacuable by rail to some General Hospital where they could receive more definite treatment. Patients were often in the hospital for less than 24 hours. For this reason the urologic work was limited mainly to conservative management and consultant examination. In selected patients, however, major surgery was performed to make the patient better fit for transportation than he would have been if symptomatic treatment only were given.

The first type of patient is epitomized by a man referred for consultation on June 9, 1944 (D-plus-3) : a sailor with a blast injury to his chest and a fractured right tibia presented gross hematuria. The patient was in a considerable shock and in severe respiratory distress. His general condition was critical and supportive measures were administered, including nasal oxygen, intravenous 5 per cent glucose, and alkalization with large intravenous doses of sodium citrate. The patient had been injured on June 5th when a minesweeper he was on hit a mine and the ship blew up and sank. He was tender in both flanks and we assumed that the hematuria was part of the general picture of blast injury of which a chest x-ray showed the rather typical findings. In a few days the patient's condition improved, his hematuria diminished. The patient received 100,000 units of penicillin and no sulfonamides. He was always able to void. Bladder catheterization and lavage was done to rule out any possibility of lower tract injury. With an additional diagnosis of blast injury to both kidneys the patient was evacua-

ted, in good condition and without hematuria, further inland to a General Hospital.

The other type of urologic patient received is well characterized by a man admitted on D-plus-4 (June 10, 1944) who had been wounded in action (gun shot wound of the left flank.) The bullet lodged beyond his bladder over the 5th lumbar vertebra in the midline. The history revealed that the patient had been wounded on June 6th but that at that time it was impossible to decide whether or not his bowel had been perforated. As his condition was not immediately serious the treatment consisted solely of penicillin administered. Up to the time of admission to our hospital the patient had received more than half a million units of penicillin. He gradually developed a board-like abdomen and on admission was dangerously ill. He had a high fever, a leukocyte count of 18,000 cells per cu. mm. with a marked shift to the left in the hemogram. He was irrational and violent and sedatives had to be given. No surgery had been done prior to admission except slight debridement of the entrance wound of the bullet. There was no drainage from the wound on admission and no history of any drainage. The patient's condition was so serious that it was felt that if nothing were done he would die, as he might also from any surgical insult. The diagnosis of peritonitis probably secondary to the severing of the left ureter or to injury to the left kidney itself was made.

Under general anaesthesia the wound was explored carefully and in dissecting it down it was found to be fairly well walled off. From the abdominal cavity 4,000 c. c. of blood-tinged urine were removed by suction. The intestines were matted together and there was evidence of walling off in the abdominal cavity. The abdomen was liberally dusted with sulfanilamide powder and drains placed along the tract and in the lateral gutter. The ureter was brought out through the wound and it drained freely post-operatively. The wound was closed loosely. At the end of the operation the patient's condition was very poor. In the next few hours the patient became increasingly comatose despite intravenous administration of fluids and sulfadiazine and intramuscular injections of penicillin. He died four hours after the operation. Clear urine was draining from the left ureter. At autospy, no perforation of the bowel was found. The intestines were matted together with a firm exudate. The bullet was not removed. An early diagnosis was missed because the force of the bullet had driven the severed end of the ureter inward and the skin had sealed over, preventing urinary leakage through the wound of entrance.

This was the only death on the urologic service during the next ten months. As more hospitals moved to the continent the operative load diminished on the Transit Hospitals. In the early days the work resembled that of an Evacuation Hospital. A great volume of work had to be done in order to make these patients ready for evacuation. Between June and September there were six major urologic operations, mainly bladder and perineal repairs. There were sixteen minor urologic operations including removal of foreign bodies from the scrotum, debridements of the genitalia, bladder, perineum and kidney region. Between June 6, 1944 and January 1, 1945, 45,000 patients were admitted to the Transit Hospital. Of that number there were almost four hundred urologic patients of all kinds, many already operated upon and in no need of immediate treatment. Others were patients with non-surgical conditions incidental to the war injuries and these were relatively minor in the great flow of battle casualties. At the turn of the year the Transit Hospital had outlived its purpose. There were so many hospitals on the continent and the method of evacuation had changed considerably so that the function of the hospital at Southampton changed to part Transit and part General.

At this time I was transferred to the 162nd General Hospital as Chief of the Urology Section. In this hospital were many old patients waiting disposition. Much of the work was diagnostic. A few urologic injuries were received from the air forces still stationed in the vicinity. Some elective work was done on hydrocoeles, a hernia with associated undescended testicle, circumcisions, secondary closures, and skin grafts.

Third Period—After the War

8 May 1945—24 December 1945. From May to September the medical load was lighter. There were no more battle casualties. How-

ever, things changed in September when the war was definitely over. This was the closing-down period. Hospitals were being deactivated, and we tried to conduct a service with less and less equipment all the time. The urologic work was much as it was prior to D-Day. There were diagnostic cystoscopies, instances of chronic prostatitis, non-specific urethritis, epididymitis, and a few ureteral calculi. None of these presented problems except that of disposition. The directives encouraged disposition to the Zone of the Interior (U. S. A.) of all patients whose condition was even slightly suggestive of long hospitalization. We knew from experience how to treat patients with non-specific urethritis. Patients who were going home were more worried than ever about the possibility that some of their overseas indiscretions may be discovered. It took much persuasion to overcome their phobias even after all tests for gonorrhea were negative.

DISCUSSION

In retrospect and review the record is not a bad one. The number of patients treated was in proportion to the incidence of disease in general. The number of urologic battle casualties was approximately 2 per cent, as was expected. There was no selection of patients and in the course of events most urologic conditions were encountered to some extent. A fairly large proportion of diseases which troops away from home tend to acquire was encountered. A great deal was learned and much was observed. Many of the battle injuries were of such a nature that their counterpart would rarely be seen in civilian life. On the other hand the management of urinary tract injuries and infections was based on the sound principles demonstrated in civilian practice and carried over to the military. The results are evident in the mortality statistics for this war which show a reduction from the First World War by half in the number of deaths. The urology service in the E. T. O. played its small part in providing the best medical care to the men in the service.

SUMMARY

The experiences of an urologist during three years of specialized service in the Army Medical Corps in the E. T. O. are presented. Special attention is given to psychogenic and mechanic urethritis, and to psychogenic and environmentally conditioned alterations in urination.

FETAL BLACKOUT

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INTRODUCTION

"Fetal blackout" is a coined phrase used here because it so amply represents the symptom complex due to anoxia in the fetus, similar to the anoxia experienced by aviators under conditions whereby the oxygen supply is depleted at high altitudes and under conditions of combat where sudden ascensions and turns were necessary. This phenomenon has been well described and sufficiently explained by anoxia.[1] Similarly, the fetus may be depleted of oxygen even to the degree of clinical cyanosis with resulting damage to nervous tissue analogous to that seen in airborne blackout.

EXPOSITION

Experiences of aviation medicine of World War II have made great contributions to medical science in general. Would one ever expect that knowledge gained through the treatment of air casualties could have any bearing on the art of obstetrics? Yet it has. For a long time students of the subject attempted to show that insufficient oxygenation of the fetus in utero and particularly during labor result in dire consequences to the new-born infant. As early as 1843 W. J. Little described a disease of infants which he attributed to asphyxia at the time of delivery. He says:

> " . . . In two cases the birth occurred at the full period of gestation, but owing to the difficulty and slowness of parturition the individuals were born in a state of asphyxia, resuscitation having been obtained at the expiration of two and four hours, through the persevering efforts of the accoucheur."[2]

The disease described in that treatise is cerebral spastic diplegia, commonly known today as Little's disease.

In more recent years others have undertaken to prove this point by studying the effects of anoxia on the histopathology of nervous tissue. They showed that of all the human tissues the central nervous system is most susceptible to

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permanent irreversible change from anoxia. Furthermore, it has been demonstrated that the fetal nervous tissue is less resistant to injuries than that of an adult. It has been pointed out that anoxemia after delivery of over two minutes' duration will cause serious cerebral alterations. Studies of brain sections show the pathology to be a "localized and generalized atrophy, medullory necrosis, and sometimes necrosis of ganglion cells with homogenization and vacuolation of the cytoplasm, and pyknosis and eccentricity of nuclei, as well as devastation and hemorrhage."[2]

Some investigators substituted for postmortem studies clinical observations of the effects of sublethal asphyxia on personality, intelligence, and motor activity of the victim. A study of 132 cases of prenatal and postnatal anoxia[3] revealed that the nervous system was damaged sufficiently to effect subsequent behavior at a later age. In addition, the type of behavior varied with the degree of anoxia. Those suffering from a lesser degree of anoxia showed an abnormal hyperactivity and hyperexcitability, while those who experienced a more severe anoxia were apathetic and incompatible with normal living, strain adding to this the liability of the loss of nervous and emotional control. In this latter group tests showed 74 per cent to be of normal intelligence, while 26 per cent were subnormal. The motor damage manifested itself in various grades of neuro-muscular incoordination from tremors and twitching to athetosis and crippling spasticity. The maximum abnormality followed the deepest oxygen deficiency. The cause for this incoordination lies in deficient myelinization of neurons and axons which is interfered with by anoxia.

The following clinical pictures have been observed as unquestioned late effects of asphyxia at birth, two or more of them usually being present in a single case:[4]

1. Mental deficiency
2. Striatal syndromes (congenital chorea, athetosis, or choreo-athetosis).
3. Motor deficiency syndromes (decerebrate rigidity, diplegia, hemiplegia or double hemiplegia).
4. Speech defects (impaired development of the function of speech or dysarthria).
5. Convulsive disorders.
6. Visual symptoms (either optic or oculomotor).
7. Cerebellar symptoms.

Recently, the author surveyed the last seventy patients admitted to the Delaware Colony for the Feebleminded: twenty-three (32.8 per cent) were shown to give a history of complications at birth, five (7.1 per cent) gave definite histories of neonatal asphyxia, and six more (8.5 per cent) gave histories of maternal toxemia, prolonged labor, and symptoms of anoxia such as muscle twitchings, convulsions and generalized rigidity. Thus, 15.6 per cent of this group gave evidence of some form of asphyxia at birth. Although significant, this estimate is relatively low as compared with reports of other investigators. It has been stated that of 500 children with brain defects, 70 per cent gave histories of asphyxia.[5]

We have now accumulated prima facie evidence of the effects of sublethal anoxia on the human nervous system. Those of us who served in areas with great air activity and had the opportunity of seeing the black-out and other oxygen deficiency cases in flyers were impressed by the damage which a deficiency of oxygen over a comparatively short time can produce. Stuttering, loss of memory, lowered intelligence, personality changes, partial blindness, and various motor defects were not uncommon observations. The patients gave a history of loss of consciousness because of some inadequacy of the oxygen apparatus while flying at high altitudes, or underwent repeated "black-outs" during the stress of combat flying.

With such evidence and with the welfare of the fetus in mind the proper management of labor becomes clear. All effort must be made ante-natally and during labor to prevent any depression of the respiratory mechanisms and to furnish an adequate supply of oxygen.

The mechanism whereby the fetus eventually receives oxygen starts with the maternal respiratory system and transcends various levels of the cardiovascular system, placenta and umbilical cord. It is important then to correct any defect at any of these levels. From a practical standpoint this amounts to the early recognition of anemia and cardiac decompensation of the mother, and the recognition of placental disease. The discovery of the latter is synonymous with early diagnosis of pre-eclampsia, syphilis, premature separation of the placenta, and the pre-erythroblastic

syndrome. It is to be stressed here, as has been brought out previously,[6] that the appearance of anti-Rh agglutinins in the serum of an Rh negative mother is a manifestation of placental pathology.

These pathological entities may prevent the proper effusions of respiratory gases as well as nutritive substances, enzymes and hormones in the utero-placental circulation. Their prompt recognition and proper management will undoubtedly do much to eliminate intrauterine asphyxia.

Although we do not underestimate the possibility of prolonged sublethal oxygen deficiency of the fetus in the pre-natal period, our greatest concern is with the oxygen supply to the fetus during labor. From this standpoint our prime concern in the first stage of labor is that of the choice of proper analgesic-amnesic drugs.

Sodium pento-barbital, even in small doses, will produce slowing of the respiratory rate.[7] In large doses it will depress the respiratory center directly, reducing the depth and rate, often with irregularities. The decreased oxygen saturation of the arterial blood after pento-barbital may persist for four hours. Furthermore, it has been shown that respiratory depression is markedly accentuated by morphine and the supplementary inhalation of anesthetics. Animal experiments by Barla and Gledhill (1939)[7] proved that the tranquilizing dose of various sedatives required to quiet the struggling movements of dorsally bound rats decreased the minute volume of respiration: morphine by 30 to 45 per cent, and pento-barbital by 50 per cent.

Paraldehyde, although an excellent drug for use during labor, is objectionable for its odor, taste, and need for experienced personnel to administer it properly. However, it is not our intention to detract from the reputation which paraldehyde has as a drug of excellent analgesic-amnesic effect without depression of respiration.

Great hope is derived from the comparatively new (1939) drug "demerol." Chemically and pharmacalogically it resembles both morphine and atropine, a sedative and antispasmodic without respiratory depressive effect. It is generally conceded that with demerol we are nearer to the ideal analgesic method in obstetrics than we ever were before. "Used with scopolamine it is not surpassed by any other drug or method that has to date been demonstrated or is at present in common use."[8]

The problems of the second stage are somewhat different. It is not within the scope of this paper to evaluate the relative merits of the various anesthetics used, except as they effect the oxygenation of the fetus. Naturally, local infiltration, caudal anesthesia, and spinal anesthesia will have no respiratory effect, unless the patient displays an idiosyncrasy to the anesthetic drug, or if a level of the drug above the third cervical segment should be obtained, a phenomenon which should never occur if caudal or intrathecal anesthesia is managed properly. Most anesthetics given in the second stage are of the inhalation type. It is important to remember to give mixtures containing not less than 20 volume per cent of oxygen, which is the concentration in the normal atmosphere. One must be careful not to produce unconsciousness by asphyxia instead of by the anesthetic. This is especially true when nitrous oxide is used.[9] It is better to supplement the nitrous oxide mixture with ether than to decrease the oxygen to below 20 volume per cent.

Another factor of the second stage is the delivery of the baby at the earliest possible moment by a procedure less traumatizing than if spontaneous labor is allowed to progress. "It is becoming increasingly evident that the prolongation of labor is by far the most outstanding single cause of asphyxia of the newborn."[10] Thus, sometimes spontaneous delivery is less preferable than a low forceps-episiotomy operation. A study of 1,048 cases showed that although the asphyxial rate was the same in spontaneous delivery and low forceps-episiotomy procedure, the death rate was somewhat lower with the latter.[10]

Even though the newborn baby may clinically not appear asphyxiated, adequate oxygenation should be assured. The cord should never be clamped until pulsation ceases; meanwhile the mother is being given pure oxygen by inhalation. Oxygen should be given the newborn until automatic regular respiratory movements are well established. The practice

of some obstetricians of giving all their newborn oxygen routinely is to be commended.

CONCLUSION

Unless we assure all fetuses and newborns adequate oxygenation, we may be starting out a child in life with a serious handicap. We can do much to prevent damage. In effect, we will not only be practicing good obstetrics, but also prophylactic psychiatry.

SUMMARY

1. Attention is called to the phenomenon of complete and partial asphyxia which may not produce clinical cyanosis.

2. It is stressed that an insufficient oxygen supply to the fetus may result in nervous manifestations later in life.

3. The management of pregnancy, so as to furnish an adequate oxygen supply to the fetus at all times until it becomes a self-sustaining organism, is outlined.

The author wishes to thank Richard R. Landes, B. Mus. Ed., E. D. M., of the Delaware Colony for his cooperation in investigating the cases reported herein.

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DISSECTING ANEURYSM OF RIGHT COLIC ARTERY*

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This case is brought to conference for diverse didactic reasons; the diagnostic problem in itself was almost insurmountable.

A 65-year-old colored man was sent to the hospital with the diagnosis of carcinoma of the colon. The family and personal history were non-contributory. On admission, the patient complained of severe colicky pain in the lower right abdomen, and stated that the attacks of pain lasted for about half-an-hour at a time, and that he had had five such spells a day for the past month.

On clinical examination the abnormal findings were sluggishly reacting pupils, fibrillation of the heart, a pulse deficit characterized

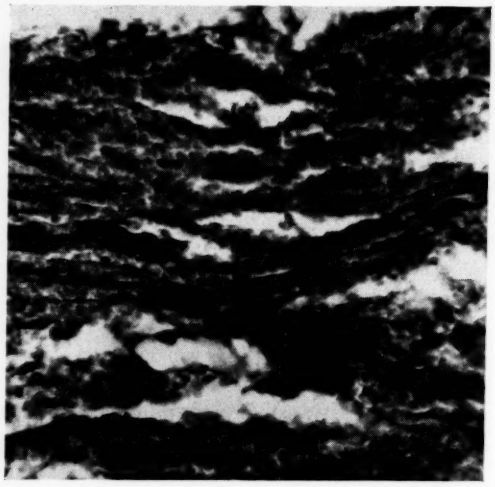

Fig. 1: Blood cells separating elastic fibers of the wall of the right colic artery; Pollak's trichrome stain, x 200.

Fig. 2: Organization of the aneurysm, penetration of fibroblasts between layers of blood clots; Hematoxylin-eosin stain, x 200.

by an apical rate of 160 and a pulse rate of 120 per minute, a liver reaching two fingers below the costal margin, a distended but not tender

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abdomen with a large palpable, fixed mass in the right lower quadrant, extravasation of urine into the peritoneum and scrotum, and an indurated, enlarged scrotum with a slough and fistula on the left side. On admission, the patient's temperature was 100° F.; respirations, 20/30; blood pressure, 130/40.

The important laboratory findings consisted of an abnormal electrocardiogram indicating left heart preponderance and coronary disease, possibly myocardial infarction; a strongly positive complement fixation reaction and Kahn test for syphilis; a blood urea nitrogen of 64 mg. per 100 ml.; and a blood creatinine of 1.8 mg. per 100 ml. Two days later these values were 86 and 2.3 mg. per 100 ml.; a hemoglobin of 11 gm. or 73.3 per cent; a red cell count of 3,650,000; and a white cell count of 13,900 per cu. mm. of blood; and a hemogram with 10 per cent myelocytes, 13 per cent stab cells, 59 per cent segmented neutrophils, 6 per cent large and 9 per cent small lymphocytes, and 3 per cent monocytes. A flat plate of the abdomen failed to reveal a neoplasm.

After two days of bed rest the fibrillation ceased and the patient was transferred from the medical to the urologic service for suprapubic cystostomy. The extravasation of urine into the perineum and scrotum was due to a stricture of the urethra. After the operation the patient took a downhill course and expired seven days later, on the 13th day of hospitalization.

At necropsy, the pathologic findings were as follows: Ruptured dissecting aneurysm of the right colic artery—a fusiform mass, 14 cm. long and 5 cm. wide and thick, surrounding the right colic artery; on section, several layers of red-brown tissue with pin-head sized calcifications between the blood clots. Beginning necrosis of the ascendant colon—dirty brown to green discoloration and atrophy of the mucosa. Peritoneal hemorrhage—red discoloration of the peritoneum spreading toward the hilus of the right kidney along the abdominal aorta and the right common iliac artery. Atherosclerosis of the aortic valve, the aorta and branches; yellowish white, elevated patches throughout the arterial system. Syphilitic aortitis—parallel, longitudinal scars in the ascending aorta. Multiple encephalomalatiae—minute areas of softening in the base of the pons, left of the midline, and in the left lenticular nucleus. Cystopyelonephritis—surface of kidneys irregular granular, cortex differentiated at the poles only; pelves and ureters widened and containing some brownish fluid; urinary bladder opened anteriorly, its mucosa reddish discolored, especially around the orifice of the right ureter; recent operative incision. Moderate hypertrophy of prostate—organ about twice the normal size, soft, nodular, on section white. Abscess and fistula of scrotum—scrotum increased twice in size and indurated; pus exudes freely from an oval, opening 2-3 cm., which exposes the left testicle; adhesions between the covers of both testicles.

All gross findings were confirmed by examination of tissue sections. The degree of kidney damage was more severe than evident at gross inspection. There was a chronic prostatitis and bilateral testicular atrophy. The aneurysm showed remnants of elastic fibers between blood clots, extensive organization of the outer layers characterized by sheets of connective tissue with capillary blood vessels penetrating into the clot, calcium deposits, and alternating layers of blood with and without old, brown-stained blood pigment.

DISCUSSION

Efforts to prepare the patient for suprapubic cystostomy, which was imperative because of extravasation of urine, diverted the attention of the physicians from the abdominal pain and mass for which the patient was sent to the hospital.

Any abdominal pain provokes a host of questions. One must inquire about localization, intensity, duration, type, provocation and relief of pain, the influence of the various body functions, and external factors. Repeated paroxysms of abdominal pain may be due to coronary arteriosclerosis, subdiaphragmatic angina[1], arteriosclerosis of mesenteric vessels,[2] intra-abdominal apoplexy,[3] aneurysm of the abdominal aorta, its branches or intrahepatic arteries, periarteritis nodosa, tabic crises, plumbism, gall bladder colic, and congestion of the liver.

In our patient tabes could be considered because of positive reactions for lues and because his pupils reacted sluggishly to light. Dyspragia intermittens angiosclerotica[2] is characterized by short attacks of severe colicky pain in

the region of the superior mesenteric artery; intra-abdominal apoplexy[3] results in similar paroxysms, a distended, tense abdomen and accelerated pulse; aneurysm of one of the larger abdominal arteries gives similar symptoms. In Ortner's disease[2] there is "dead" meteorism without visible or audible peristalsis of meteoritic loops of the colon. Intra-abdominal apoplexy[3] up to now has been diagnosed only at surgical operation or autopsy. With aneurysm of the abdominal aorta the pain radiates to the scrotum and hypogastrium.

A hard mass in the lower left quadrant may be due to an intestinal tumor first, mostly a carcinoma of the cecum or ascending colon; rarely to a polyp, adenoma or a carcinoid; to regional enteritis, ileus, intussusception, tuberculous or non-tuberculous adhesions, calcified nodes; lymphoma, lymphosarcoma, Hodgkin's disease; actinomycosis, gumma, and finally to an aneurysm.

In our patient, the majority of these conditions could be eliminated because of absence of nausea and vomiting and because of negative roentgenoscopic findings. A gumma which would reach the dimensions of the mass in our man and which would be located in the lower right abdomen has yet to be found. Actinomycosis could not be ruled out with certainty, although the cecum and appendix are usually primarily involved in an extensive process localized in the right lower abdomen. Aneurysm was another diagnostic possibility. Roentgenoscopic examination after oxygen insufflation into the peritoneal cavity or peritoneoscopy would have facilitated the diagnosis; the patient's condition did not allow such elaborate procedures. The flat plate had to be done in the ward.

The two outstanding signs and symptoms were the paroxysms of abdominal pain without nausea or vomiting, and the fixed, hard mass in the right lower abdomen. If one considers the two features simultaneously the possible causes narrow down to arterial aneurysm and to actinomycosis.

In view of the absence of pulsation and bruit I would have been inclined to diagnose the mass as actinomycosis in an untreated syphilitic patient. The cardiac symptoms were consistent with either syphilitic or coronary disease. The affliction of the urinary organs was a separate process, the urethral stricture was possibly due to an old gonorrhoic process. The gross and microscopic post-mortem examinations revealed dissecting aneurysm of the right colic artery as the true diagnosis. The extensive organization and calcification of the vascular cavitation explained the absence of pulsation and bruit.

SUMMARY

An instance of an organized and partly calcified dissecting aneurysm of the right colic artery, which posed a difficult diagnostic problem, is presented.

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MISCELLANEOUS

Re: Birth Certificates

In an effort to have Delaware's birth certificates be more accurate records of the state's citizens, the State Board of Health began last September to issue a new form to parents. This was an unverified, miniature copy of the birth record printed on a form letter and filled in as the doctor filled in the original form that he filed with the State Board of Health. Parents do not receive a birth certificate for their new-born baby unless they O. K. this query form, change anything that the doctor has written incorrectly, and return the form to the State Board of Health in Dover.

In an effort to find out how well the new system was working in Delaware, a representative of the U. S. Census Bureau has now completed a study of some 2,000 Delaware birth certificates filed during the six months' period, and about an equal number of the verifications. Results show that about half of the original certificates that were filed were incomplete or in error, and that on the verification sheets 1,700 additions or corrections were made by the parents.

In the past, birth records have often been filed with the Board's Bureau of Vital Statistics by the doctors delivering the babies without having the child's name filled in or having the parents O. K.-ing the information such as

their correct and complete names, their ages or birthplaces or, indeed, the birthplace of the child. This has led to many difficulties when, years later, people come to the Bureau of Vital Statistics expecting to get accurately filled out birth certificates.

A doctor is required by law to file a birth record with the State Board of Health for each baby that he delivers and it is expected that the mother will check the facts on the birth record carefully with the doctor or hospital when she is asked to sign the record verifying the name of the child and other legal items.

The magnitude of keeping birth records of Delaware's new children can be seen from the statistics which show 6,019 babies born in Delaware during 1945, 6,055 during 1944 and about 2,300 during the first 5 months of the current year.

Miss Mildred Spencer as Special Agent, Bureau of Census, heads Delaware's Bureau of Vital Statistics under Dr. Edwin Cameron, State Registrar. She is assisted by a staff of six.

Dr. Cameron points out that an accurate birth certificate is a very important piece of paper, for it makes known who a person is and when and where he was born. The presentation of a birth certificate is the most satisfactory way to prove that an individual is the proper age to go to school, to work, to marry, to hold office, to claim social security benefits. It is the easiest way of proving citizenship upon application for a passport, and the simplest method of showing family relationships when claiming servicemen's dependents' allowances.—Del. St. Bd. Health.

MEDICAL SOCIETY OF DELAWARE

Dover, Tuesday, October 8, 1946

A. M.

10:00 General Session
Invocation

10:05 Address of welcome

10:15 The Symptoms and Signs of Acute Poliomyelitis, Dr. George J. Boines, Wilmington

10:55 Medical Rehabilitation, the Doctor's Responsibility, Dr. Alfred R. Shands, Jr., Wilmington

11:35 Delaware Study of Child Health Services, Dr. John McK. Mitchell, Rosemont, Pa.

P. M.

12:30 Luncheon—Medical Society of Delaware

2:00 General Session

2:00 The Problem of Deafness, Dr. James Marvil, Laurel

2:40 Thrombo-embolic Emergencies, Dr. Thomas M. Durant, Philadelphia

3:20 Clinical Use of Streptomycin, Dr. Harrison F. Flippin, Philadelphia

4:00 Diagnosis of Intra-ocular Tumors, Dr. Arthur J. Bedell, Albany

4:45 Movies—Managing Fresh Wounds of Violence

6:30 Supper

9:00 Meeting of House of Delegates

Wednesday, October 9, 1946

A. M.

9:30 General Session
Report of House of Delegates

9:45 Uretro-intestinal Anastomosis and Vesicle Carcinoma, Dr. Brice S. Vallett, Wilmington

10:25 The Common Problems of the Medical Practitioner and the Specialist in the Diagnosis and Treatment of Gynecologic Disease, Dr. Thaddeus L. Montgomery, Philadelphia

11:05 Continuous Spinal Anaesthesia in Thoracic & Abdominal Surgery, Dr. William T. Lemmon, Philadelphia

11:45 Address of President, Dr. Walter C. Deakyne, Smyrna

12:00 Election of President for 1947

P. M.

12:15 Adjournment

12:30 Luncheon and Auxiliary, guests of Kent County Medical Society

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* *Laryngoscope, Feb. 1935, Vol. XLV, No. 2, 149-154*
Laryngoscope, Jan. 1937, Vol. XLVII, No. 1, 58-60

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+ Editorial +

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VOL. 18 AUGUST, 1946 No. 8

PEDIATRIC SURVEY

The American Academy of Pedriatics is undertaking a study of child health services because of the realization that thorough and systematic planning in the postwar era will be necessary in order to provide children with the care which they need. The Academy feels that the responsibility for such planning rests with physicians, since they, for the most part, must provide the care.

The study is intended to determine what services are available, and to evaluate the quality of these services, and will fall into four categories:

(1) Hospital facilities for the care of children.

(2) Community health services—public and private. This will cover the general health services, such as child health conferences, school health services, child guidance clinics, immunization programs, and public health nursing.

(3) The distribution, qualifications, and activities of professional personnel. These data will be collected from pediatricians, general practitioners, and specialists who care for children.

(4) Pediatric education. This division of the study is not a part of the state program but will be carried out on a national basis by a special committee appointed for the purpose and will evaluate the quantity and quality of training in pediatrics in the 66 medical schools throughout the country.

One of the primary purposes of the survey is to stimulate local groups to see the needs within their own communities and to evaluate existing facilities. The factual data collected will be used by the Academy as a basis for developing recommendations for medical care programs.

The importance of this survey cannot be overestimated. It is a major effort of an organized group of medical men to inquire into its own affairs. It has nothing to do with any of the federal proposals for medical care, such as the Pepper or Wagner Bills, the principles and purposes of which are socialistic and Un-American, and hence are opposed by all decent doctors. So, doctor, when you receive their brief questionnaire, please take the few minutes required to fill it out and return it to the Society—at 908 West street, Wilmington.

CORRECTION

In our July editorial in reference to the Wilmington City Council raising the annual medical license fee from $10 to $50 per year, we stated that this raise would not be effective till June 1947. We were in error. The increase becomes effective in September, 1946. As suggested in the editorial, the New Castle County Medical Society has requested the city fathers to grant a review or hearing on this outrageous tax.

THE HEARINGS ON THE WAGNER-MURRAY-DINGELL BILL

In this issue of THE JOURNAL appears the final instalment of the hearings on the Wagner-Murray-Dingell bill, the publication of which has been continued in THE JOURNAL since May. THE JOURNAL suggested, in reporting the first day of this extraordinary manifestation of the workings of a democracy, that the whole performance had been developed by Messrs. Wagner, Murray, Pepper, Dingell et al.—which includes, of course, their associates, such as employees of the Social Security Board and Michael Davis—as propaganda in behalf of the contemplated legislation. An analysis of the hearings indicates that more persons were heard favorable to the legislation than unfavorable and that many of those unfavorable to the legislation who were of professional or public stature equal to or greater than those who appeared for it were not permitted to have their say. The technics employed in conducting these hearings might well be considered a foretaste of the operations of national compulsory sickness insurance if the Wagner-Murray-Dingell bill should be enacted.

Evidence brought out in the hearings through the astute questioning of Senator Donnell revealed the nature of the little groups marshaled behind the legislation, including the so-called Committee on the Nation's Health, the Committee for Medical Care and the Physicians Forum. Pitiful, indeed, was the exhibition by Dr. Channing Frothingham, whose testimony revealed how he was made a front for the propaganda group assembled by Michael Davis and how little he knew of the actual workings of the organization that he heads. Apparently he was unable to remember the names of his associates; after condemning the writings of some of those opposed to the measure, he indicated that he had never read them.

The hearings served, moreover, to bring to light the problems that the medical profession must face and the persons who use public office to exalt their bureaucracies. There too were the executive secretaries of various pressure groups who presume to speak for considerable numbers of people whose views they have never ascertained.

The incisive questioning by Senator Donnell established definitely that there can be no free choice of physician by patient under any government controlled medical service, that nationalization lends itself to the political degradation of medical practice that it makes the politician the important figure in medical care, that it takes from the physician his right to practice his profession as a scientist and that it is in every sense a "taking over of medicine by the state."

Outstanding also were the comments even by those who opposed the point of view of the American Medical Association—and, incidentally, of the vast majority of American physicians—indicating their recognition of the high scientific status of the medical profession, their respect for physicians as a profession, their esteem for the publications of the American Medical Association and their recognition that it was the physicians themselves, through their organization, that raised the standards of medical education, improved the quality of our hospitals, eliminated quackery, promoted scientific research, participated with public health officials in lowering sickness and death rates and made possible through their magnificent service in the armed forces the winning of the war.

Why Does Medicine Get Kicked Around?

A correspondent writes to ask why the medical profession gets kicked around. He says: "Take some facts cited from an article in the April 13 number of the *Journal of the American Medical Association*. The development of penicillin. The use of blood and blood substitutes in the treatment of shock. The reduction of the death rate of the wounded to 4.5 per cent from 8.26 per cent in World War I. Three cases of tetanus among the immunized personnel in the Army. One case of tetanus among the battle casualties. The effect of DDT in the practical suppression of typhus fever. Influenza and malaria dealt with as never before. Practically one-third of the medical profession volunteering for duty with the armed forces.

"Why does the profession that has trained the men who have accomplished these results allow itself to be kicked around by professional do-gooders and ambitious politicians?

"In the course of hearings held in Washington in April on the National Health Program,

Dr. Mountin, of the Public Health Service, stated that medical research and medical education, as well, are properly functions of the Federal government. If this is so, we have then in the making a Federal empire of medicine.

"During the past twenty-five years, the high standards of medical practice which have increasingly characterized American medicine have been the direct result of a calculated program for the continuous education of the young physician. The future programs of medical science, the nature of service that will be rendered or the type of person who will choose the profession of medicine in years to come seem of little concern to Senators Murray and Wagner.

"A profession which has accomplished the advances we have mentioned might be thought justified in its request to be spared from government control. Is there anyone who does not know that, with very few exceptions, when government enters integrity flies out of the window? Politicians would soon want medical patronage for their districts and the qualifications of any doctor would not be 'What do you know?' but 'Whom do you know'?"

He asks whether there is anyone who does not know, that with very few exceptions, when government enters in, integrity flies out of the window. Obviously there are some who do not know it, or will not admit it; or knowing it, do not care. Medicine is a minority group easily kicked around, its aims are specific; it is not an organized pressure group nor, in our opinion, should it be. Its physicians know nearly everyone in the country at some time or other between the cradle and the grave. But the doctors know people professionally, in large measure, not for political purposes.

Medicine is paying a price it seems to us for allowing itself to become fixed—to its hospitals, to its large schools, to its own state and National societies, in a word, to the multitude of tangible, taxable fixtures which have now become so necessary to its functioning as to invite governmental management, control and direction, price fixing, and regulation.

Good medicine suffers in many peoples' minds because of bad distribution, excessive costs to consumers. They think that doctors know medicine but that they do not know how to distribute what they know and can do.

In their opinion the doctors would not be kicked around if medicine were government managed. In some ways this confidence in government efficiency is naive and refreshing. It has refreshed New Zealand no end, and is about to refresh Great Britain. What chance have we in the United States to avoid what other people have invited for themselves? Doctors can only advise, the people decide. Editorial, *N. Y. St. J. M.*, July 15, 1946.

DOCTORS TELL HOW SHELL FRAGMENT WAS REMOVED FROM SOLDIER'S HEART

Two doctors in the Army Medical Corps report the successful removal of a shell fragment from the heart of a 23-year-old American soldier in an article appearing in the current issue of the *Archives of Surgery*, published by the American Medical Association.

The authors—Lieut. Col. William R. Schaefer and Capt. Victor P. Satinsky, Medical Corps, Army of the United States—say that the soldier was wounded June 24, 1944, near Cherbourg, France, when a mortar fragment "stung him through his back." X-ray films failed to reveal the shell fragment because of the collection of blood in the chest cavity.

The foreign body was located, however, by fluoroscopic examination which revealed that the object moved with the beat of the heart. Surgical exploration showed the fragment had cut through the lung and penetrated the heart. A small incision was made in the left chamber of the heart and the fragment was grasped and removed by clamps. The patient was given transfusions and treated with oxygen, sulfadiazine and penicillin.

The authors state that "six weeks following operation, the patient was permitted out of bed and graduated exercises were begun. Special exercises were instituted early to assist in the reexpansion of the lung (which was collapsed), to prevent deformity and to aid in the development of the thoracic (chest) cage. These exercises were carried out regularly four times daily. . . . Four months after operation, the patient is in excellent condition."

BOOK REVIEWS

A Textbook of Gynecology. By Arthur Hale Curtis, M. D., Professor and Chairman of the Department of Obstetrics and Gynecology, Northwestern University Medical School. Fifth edition. Pp. 755, with 455 illustrations, chiefly by Tom Jones, including 36 in color. Cloth. Price, $8.00. Philadelphia: W. B. Saunders Company, 1946.

This deservedly popular book has been appearing in a new edition regularly every few years since 1930. This present edition shows considerable revision, with only a few pages added. The most important additions are in the chapter on ovarian tumors. Special stress is laid on the endocrine pictures in gynecology, a rapidly enlarging phase; and on penicillin in the treatment of gonorrhea. New subjects are also found in the chapter on tumors of the uterus. The illustrations are excellent; the ones in color are both numerous and beautiful.

Curtis' book is still one of the most outstanding texts in its field.

Peritheral Vascular Diseases. By Edgar V. Allen, M. D., and Nelson W. Barker, M. D., and Edgar A. Hines, Jr., M. D., Associate Professors of Medicine Mayo Foundation, Graduate School, Univ. Minnesota; with Associates in Mayo Clinic and Mayo Foundation. Pp. 871 with 386 illustrations, 7 in color. Cloth. Price, $10.00. Philadelphia: W. B. Saunders Company, 1946.

If ever there was a timely book, this is it. As the three major authors say, the "extensiveness of the unknown" is impressive. These three, with the aid of 11 other contributors, have crystallized the experience of the Mayo Clinic and produced a book that may well represent the beginning of a new era in the research of a field that hitherto has been comparatively static for these many years.

Their idea that "peritheral" means all vessels distal to the heart is sound, as is their inclusion of the lymph vessels.

With thousands of veterans returning with frost bite or trench foot, for instance, their discussion is both valuable and helpful, despite the absence of definitive therapy. And as to the age-old problem of varicose veins, etc., they fortunately put the soft pedal on such farfetched and unphysiological procedures as lumbar sympathectomy, which they tried out and abandoned.

What medical man today, if in active practice, can afford to be without the knowledge epitomized in this excellent volume?

Women In Industry—Their Health and Efficiency. Issued under the auspices of the Division of Medical Sciences and the Division of Engineering and Industrial Research of the National Research Council. Prepared in the Army Industrial Hygiene Laboratory by Anna M. Baetjer, Sc. D., Assistant Professor of Physiological Hygiene, School of Hygiene and Public Health, Johns Hopkins University. Pp. 345. Cloth. Price, $4.00. Philadelphia: W. B. Saunders Company, 1946.

The title of this volume describes the volume. What it connotes, but does not specifically denote is, that woman-power has a definite place in the economics of today; that it is here to stay; and that its sensible management depends upon a sympathetic and scientific understanding of woman's physical and mental attributes. But what mere layman (the usual employer) knows enough about women to employ and supervise them with any real degree of satisfaction to either employer or employee? The usual practice has been to "hire 'em and fire 'em," according to their ability to produce, as compared to men employees. This informative little book should appeal to labor and management rather than to the medical profession.

Here is a really worth-while book on a subject about which not too much has been written that is really worth-while; and as such we recommend it highly.

Modern Drug Encyclopedia and Therapeutic Index. Edited by Alexander G. Gutman, M. D., Assistant Professor of Medicine, Columbia University. Third edition. Cloth. Pp. 1157. Price, $10.00. New York: Yorke Publishing Company, 1946.

When we reviewed the second edition of the work in January, 1941, we said it "fills a definite need." We reiterate that statement. This work, the only one of its kind, includes all the so-called "ethical proprietaries," i. e., those that are advertised only to the profession. The claptrap that is so unctiously dished out to the laity direct cannot "make" Gutmans' volume.

The work has been completely rewritten and brought up-to-date. Approximately 8,000 medicinal preparations are presented. A supplement, "New Modern Drugs," will be issued quarterly to all subscribers at no additional cost. As an index of the "ethical proprietaries" this work again "fills a definite need."